REMARKS

Reconsideration of the above-identified application in view of the present amendment is respectfully requested.

The present invention is directed to a side curtain and a fill tube for delivering helium inflation fluid to the curtain from a stored helium inflator. The fill tube heats the helium inflation fluid so that the curtain inflates at an ambient temperature. This is not taught or suggested in the prior art.

By the present amendment, claims 42-45 and 47 have been canceled, claims 1, 35, 46, 48, and 52 have been amended, and new claims 55 and 56 have been added. Claims 1-41, 46, and 48-56 are pending in the application.

Claims 1, 35, 46, and 52 were rejected under 35 U.S.C. §103(a) as being unpatentable over Bowers, in view of Lewis and Mahon.

As amended, independent claims 1, 35, 46, and 52, recite the combination of a fill tube and a stored helium inflator for inflating a side curtain evenly along its length initially to a first pressure and then and maintaining the curtain inflated above a second pressure, less than the first pressure, for 5-7 seconds, wherein the helium inflation fluid has a temperature about equal to ambient for at least 95% of the 5-7 seconds. The combination of the stored helium inflator and the fill tube provides these results. This combination is not taught or suggested in the prior art.

The inflation pressure, temperature and duration recited in claims 1, 35, 46, and 52 are achieved by using the helium

inflation fluid in conjunction with the fill tube. As stated beginning on page 23, line 4, the cross-sectional flow area of the fill tube must be sized so as to deliver the fluid to the inflatable curtain at a molar flow rate sufficient to inflate the curtain to the desired pressure (149-163 kPa absolute) within the required inflation time (20-30 milliseconds). Also, in sizing the tube, the outlet apertures are numbered, grouped, and spaced in order to inflate the curtain evenly along its length. As stated in the paragraph beginning on page 24, line 3, the cross-sectional flow area of the fill tube is also sized so as to cause the helium inflation fluid to maintain a supersonic velocity in the tube. The helium thus gains heat from compressive heating in the tube, shock wave propagation/oscillation in the tube, and thermodynamic heat transfer from the tube. Using a fill tube sized so as to produce these results is not taught or suggested in the prior art.

None of the references cited in the Office Action teach or suggest the combination of a fill tube and a stored helium inflator for inflating a side curtain evenly along its length initially to a first pressure and then maintaining the curtain inflated above a second pressure, less than the first pressure, for 5-7 seconds, wherein the helium inflation fluid has a temperature about equal to ambient for at least 95% of the 5-7 seconds. The cited references may disclose individual ones of these elements, but none of the cited references recognizes the advantages realized through the specific combination cited in claims 1, 35, 46, and 52.

Bowers is directed to an elastomeric construction of a side curtain. Bowers does not disclose a stored helium inflator. In Bowers, the type of inflator is not important. (See column 2, lines 1-7). Bowers does not disclose inflating the curtain evenly along its length, or maintaining the inflated curtain above a specific inflation pressure or the inflation fluid at a specific temperature.

Lewis is directed specifically to an augmented inflator for a side impact air bag wherein a pyrotechnic material is used to heat a stored inflation fluid. Lewis does not disclose inflating the air bag evenly along its length or maintaining any specific inflation pressure for a desired period of time. In Lewis, the desired inflation temperature is achieved by heating the inflation fluid using pyrotechnic heat augmentation.

Mahon is directed specifically to a passenger side front impact air bag and addresses the unique problems posed with such a bag in the event of an out of position occupant. Mahon teaches an air bag inflator with a pulse shaping feature that provides lower initial inflation pressures and subsequent higher pressures. The teachings of Mahon are exactly opposite the teachings of the present invention, which teach an initial high pressure and subsequent lower pressure. Mahon also does not disclose inflating the air bag evenly along its length, or maintaining any specific inflation pressure or temperature for a desired period of time.

None of these references teach or suggest the combination of a stored helium inflator and a fill tube for delivering the

helium to an inflatable side curtain to inflate the curtain at ambient temperature. These references do not recognize that proper fill tube construction can be used to take advantage of the unique physical properties of helium to inflate an inflatable curtain to a desired pressure and temperature in a desired amount of time and maintain that temperature and pressure for a desired duration.

For the reasons stated above, it is respectfully submitted that the rejection of claims 1, 35, 46, and 52 under 35 U.S.C. §103(a) is improper and should be withdrawn. Claims 2-34 depend from claim 1, claims 36-41 depend from claim 35, claims 48-51 depend from claim 46, and claims 53-54 depend from claim 52. These claims are therefore allowable as depending from an allowable claim and for the specific features recited therein. Claims 1-54 are thus allowable.

Applicants further submit the following in response to specific assertions made in the Office Action:

In response to the assertion that Lewis teaches an inflation fluid consisting of helium, it is submitted that, as stated above, Lewis teaches an augmented inflator and therefore does not teach a stored inflation fluid consisting essentially of helium. Lewis clearly uses a pyrotechnic material to augment the stored gas with heat and combustion products.

Also, contrary to that which is asserted in the Office Action, inflating the curtain with substantially equal temperature and pressure is not merely an issue of evenly spacing the outlet apertures. As taught by the present

invention, the groups of apertures do not include the same numbers of apertures and are not evenly spaced. By the teachings of the present invention, the diameter of the fill tube, the number of apertures in each group, and the spacing of the groups is selected in order to provide sonic flow into the curtain based on the volume of the curtain and the specifications (volume, pressure, etc.) of the inflator. (See page 23, line 4 through page 24, line 15). The apertures are not merely spaced evenly along the length of the fill tube.

Regarding Stevens disclosing directing inflation fluid at a supersonic velocity and creating a shock wave, it is noted that Stevens achieves this using a Pyrotechnic inflator. Stevens does not teach or suggest achieving these results using a stored helium inflator having a fill tube sized so as to deliver the required volume of inflation fluid while achieving these flow characteristics.

Claims 6-16, 25 were rejected as being obvious because the inflator size and the size and spacing of the apertures are application specific. As stated above, the specification clearly sets forth how the construction of the fill tube, i.e., tube diameter and aperture size and spacing, are determined as a function of the curtain volume and inflator volume/pressure in order to inflate the curtain evenly along its length to a first pressure and then and maintaining the curtain inflated above a second pressure, less than the first pressure, for 5-7 seconds, wherein the helium inflation fluid has a temperature about equal to ambient for at least 95% of

the 5-7 seconds. This is not taught or suggested in the prior art.

New claim 55 recites an inflatable side curtain, a stored helium inflator, and means for directing helium inflation fluid into the inflatable curtain. The means directs the helium inflation fluid into the side curtain to inflate the side curtain evenly along its length initially to a first pressure and then maintain the curtain inflated above a second pressure, less than the first pressure, for 5-7 seconds. The means delivers the helium inflation into the side curtain at a temperature about equal to ambient for at least 95% of the 5-7 seconds. The means for directing the helium inflation fluid into the side curtain comprises a fill tube.

New claim 56 recites an inflatable side curtain , a stored helium inflator, and a fill tube for directing the helium inflation fluid into the side curtain. The fill tube distributes the helium inflation fluid evenly along the length of the side curtain to cause pressurization of the side curtain evenly along its length and maintain this pressurization for at least 5 seconds. The fill tube also heats the helium inflation fluid so that the helium in the side curtain has a temperature about equal to an ambient temperature in which the side curtain is deployed for at least 95% of the at least 5 seconds.

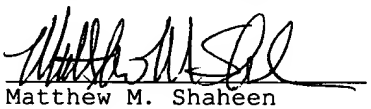
The prior art cited in the Office Action does not teach or suggest these features. Thus, for the same reasons stated above in reference to claims 1, 35, 46, and 52, new claims 55 and 56 should be allowed.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with Markings to Show Changes Made**."

In view of the foregoing, it is respectfully submitted that the above identified application is in condition for allowance, and allowance of the above-identified application is respectfully requested.

Please charge any deficiency or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0090.

Respectfully submitted,



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Version with Markings to Show Changes Made

IN THE CLAIMS:

Claims 1, 35, 46, 48, and 52 have been amended as follows:

1. (Amended) Apparatus for helping to protect an occupant of a vehicle that has a side structure and a roof, said apparatus comprising:

an inflatable vehicle occupant protection device that is inflatable away from the vehicle roof into a position between the side structure of the vehicle and a vehicle occupant, said inflatable vehicle occupant protection device defining an inflatable volume and having a length extending along the side structure of the vehicle, said inflatable volume including a forward portion for location forwardly in the vehicle and a rearward portion for location rearwardly in the vehicle;

an inflation fluid source that provides inflation fluid for inflating said inflatable vehicle occupant protection device, said inflation fluid consisting essentially of helium stored under pressure; and

a fill tube having a portion located in said inflatable vehicle occupant protection device extending into said forward portion and said rearward portion of said inflatable volume, said fill tube being in fluid communication with said inflation fluid source, said inflation fluid source, when actuated, providing said inflation fluid to said fill tube, said fill tube including outlet apertures positioned

along said portion of said fill tube for directing said inflation fluid into said inflatable volume to inflate said inflatable vehicle occupant protection device initially to a first desired pressure and maintain said inflatable vehicle occupant protection device inflated above a second desired pressure, less than said first desired pressure, for a predetermined period of time, said predetermined period of time being at least 5-7 seconds;

said inflation fluid being directed through said outlet apertures into said forward portion and said rearward portion of said inflatable volume to inflate said forward and rearward portions, said inflation fluid directed into said forward portion and said inflation fluid directed into said rearward portion having generally the same temperature and generally the same pressure during initial inflation of said inflatable vehicle occupant protection device, said inflation fluid in said inflatable vehicle occupant protection device having a temperature about equal to an ambient temperature in which said inflatable vehicle occupant protection device is inflated for at least 95% of said predetermined period of time.

35. (Amended) Apparatus for helping to protect an occupant of a vehicle that has a side structure and a roof, said apparatus comprising:

an inflatable vehicle occupant protection device that is inflatable away from the vehicle roof into a position between the side structure of the vehicle and a vehicle

occupant, said inflatable vehicle occupant protection device defining an inflatable volume and having a length extending along the side structure of the vehicle;

an inflation fluid source that provides inflation fluid for inflating said inflatable vehicle occupant protection device, said inflation fluid consisting essentially of helium stored under pressure; and

a fill tube having a portion located in said inflatable vehicle occupant protection device extending into said inflatable volume, said fill tube being in fluid communication with said inflation fluid source, said inflation fluid source, when actuated, providing said inflation fluid to said fill tube, said fill tube including outlet apertures positioned along said portion of said fill tube for directing said inflation fluid into said inflatable volume to inflate said inflatable vehicle occupant protection device initially to a first desired pressure and maintain said inflatable vehicle occupant protection device inflated above a second desired pressure, less than said first desired pressure, for a predetermined period of time, said predetermined period of time being at least 5-7 seconds;

said inflation fluid being directed through said outlet apertures into said inflatable volume to inflate said inflatable volume, said inflation fluid directed into said inflatable volume having a temperature that is generally the same and a pressure that is generally the same throughout the length of said inflatable vehicle occupant protection device during initial inflation of said inflatable vehicle occupant

protection device, said inflation fluid in said inflatable vehicle occupant protection device having a temperature about equal to an ambient temperature in which said inflatable vehicle occupant protection device is inflated for at least 95% of said predetermined period of time.

46. (Amended) A method for helping to protect an occupant of a vehicle that has a side structure and a roof, said method comprising the steps of:

providing an inflatable vehicle occupant protection device that is inflatable away from the vehicle roof into a position between the side structure of the vehicle and a vehicle occupant, said inflatable vehicle occupant protection device defining an inflatable volume and having a length extending along the side structure of the vehicle, said inflatable volume including a forward portion for location forwardly in the vehicle and a rearward portion for location rearwardly in the vehicle;

providing an inflation fluid source that provides inflation fluid for inflating said inflatable vehicle occupant protection device, said inflation fluid source, when actuated, providing said inflation fluid to inflate said inflatable vehicle occupant protection device initially to a first desired pressure and maintain said inflatable vehicle occupant protection device inflated above a second desired pressure, less than said first pressure, for a predetermined period of time, said predetermined period of time being at least 5-7 seconds, said inflation fluid consisting essentially of helium

stored under pressure, said inflation fluid source being free from pyrotechnic material for heating said inflation fluid; and

providing a fill tube for directing said inflation fluid into said forward portion and said rearward portion of said inflatable volume, said inflation fluid directed into said forward portion and said inflation fluid directed into said rearward portion having a temperature that is generally the same and a pressure that is generally the same during initial inflation of said inflatable vehicle occupant protection device to cause said inflatable vehicle occupant protection device to inflate evenly throughout the length of said inflatable vehicle occupant protection device, said inflation fluid directed into said inflatable vehicle occupant protection device having a temperature about equal to an ambient temperature in which said inflatable vehicle occupant protection device is inflated for at least 95% of said predetermined period.

48. (Amended) The method of ~~claim 47~~ claim 46, further comprising the steps of providing said fill tube having a predetermined cross-sectional flow area and a predetermined number of said outlet apertures spaced a predetermined distance apart from each other along said portion of said fill tube, said predetermined cross-sectional flow area, said predetermined number of outlet apertures, and said predetermined distance being selected to provide said

inflation fluid in said forward and rearward portions at generally the same pressure and temperature.

52. (Amended) Apparatus for helping to protect an occupant of a vehicle that has a side structure and a roof, said apparatus comprising:

an inflatable vehicle occupant protection device that is inflatable away from the vehicle roof into a position between the side structure of the vehicle and a vehicle occupant, said inflatable vehicle occupant protection device defining an inflatable volume and having a length extending along the side structure of the vehicle;

an inflation fluid source for providing inflation fluid to inflate said inflatable vehicle occupant protection device, said inflation fluid consisting essentially of helium stored under pressure; and

a fill tube having a portion located in said inflatable vehicle occupant protection device, said fill tube being in fluid communication with said inflation fluid source, said inflation fluid source, when actuated, providing said inflation fluid to said fill tube, said fill tube directing said inflation fluid into said inflatable volume to inflate said inflatable vehicle occupant protection device initially to a first desired pressure and maintain said inflatable vehicle occupant protection device inflated above a second desired pressure, less than said first desired pressure, for a predetermined period of time, said predetermined period of time being at least 5-7 seconds, said fill tube being adapted

to deliver said inflation fluid into said inflatable volume such that said inflation fluid directed into said inflatable vehicle occupant protection device has a temperature about just above an ambient temperature in which said inflatable vehicle occupant protection device is inflated.